What is claimed is:

Claim 1. A particle size distribution device for measuring the size of particles by irradiating the particles in a carrier medium with radiation that can be diffracted and/or scattered by the particles and detected by a plurality of detectors, comprising:

a radiation unit for applying radiation to a measurement cell;

a concentration level adjusting unit for changing a relative amount of particles to an amount of carrier medium to be applied to the measurement cell;

a storage device for storing the outputs of the detectors for each concentration level irradiated;

a correction unit for providing a concentration correction constant; and

a calculating unit for providing particle size distribution outputs from the outputs of the detectors as adjusted by the concentration correction constant.

Claim 2. The particle size distribution device of Claim 1 wherein the correction unit generates a proportional relationship between concentration levels and corresponding detector outputs and adjusts the measured detector outputs relative to the proportional relationship to provide a concentration correction constant.

Claim 3. The particle size distribution device of Claim 2 wherein the concentration level adjusting unit provides a concentration level that is substantially free of concentration errors in the detectors to enable a determination of the proportional relationship.

Claim 4. The particle size distribution device of Claim 2 wherein the calculating unit subtracts a concentration correction constant from each of the detectors outputs to enable a determination of the particle size distribution.

Claim 5. In a particle size distribution device for measuring the size of particles by irradiating the particles in a carrier medium with radiation and detecting the influence of the particles on the radiation, the improvement of enabling a compensation for the amount of particles in the medium, comprising:

a concentration level adjusting unit for changing a relative amount of particles to an amount of carrier medium to enable measurements of an influence of particles on the radiation that are substantially free from an effect relating to a level of concentration of particles to the carrier medium; and

a correction unit for generating a proportional relationship between the amount of particles in the carrier medium and the output of the detectors, substantially free from an effect relating to the level of concentration of particles to the carrier medium, based on measurements form the concentration level adjustment unit to enable a calculation of concentration correction constants.

Claim 6. A method of correcting for concentration errors generated by particles in a carrier medium that are irradiated and measurements are taken by detectors, comprising the steps of:

deriving a proportional relationship between the amount of particles in the carrier medium and an output of detectors in a concentration range substantially free from an effect relating to the level of concentration of particles to the carrier medium;

extending the proportional relationship through concentration ranges that have an effect relating to the level of concentration of particles to the carrier medium; and

determining concentration correction constants from a difference between the proportional relationship and detector outputs in the concentration ranges that have an effect relating to the level of concentration of particles to the carrier medium.

Claim 7. A particle diameter distribution measuring method for measuring the particle diameter distribution of a measuring sample, based on the detection values of plural

detectors provided for detecting at predetermined angles diffracted light and/or scattered light generated when light is applied to the measuring sample comprising the steps of:

storing the output of the respective detectors at different concentrations of the measuring sample;

determining concentration correction constants for correcting the detection values of the respective detectors at different concentrations of the sample;

correcting detection values of the respective detectors by using the concentration correction constants, and determining the particle diameter distribution by using the corrected detection values of the respective detectors.

Claim 8. A particle diameter distribution measuring device for measuring particle diameter distribution of a measuring sample, based on the detection values of plural detectors provided for detecting at predetermined angles diffraction light and/or scattered light generated when light is applied to the measuring sample, comprising:

a storage part which stores the detection values of the detectors separately for each concentration of measuring sample and carrier fluid when the measuring sample is diluted to different concentrations; and

an arithmetic processing part for generating concentration correction constants to remove an influence of error resulting from the concentration of the measuring sample separately for each detector by analyzing the detection values of the detectors stored in the storage part in association with the concentrations of the measuring sample.

Claim 9. A particle diameter distribution measuring device for measuring the particle diameter distribution of a measuring sample, based on the detection values of plural detectors provided for detecting at predetermined angles diffraction light and/or scattered light generated when light is applied to the measuring sample, comprising:

a storage part which stores concentration correction constants obtained by finding the amount of correction in the detection values of the detectors in accordance with different concentrations of the measuring sample, based on the detection values of the

detectors measured a plural number of times by changing the concentration of the measuring sample in a carrier fluid; and

an arithmetic processing part which corrects the detection values of the detectors in accordance with the concentrations of the measuring sample by using the concentration correction constants, and then calculates the particle diameter distribution by using the corrected detection values.

Claim 10. A measuring program executed by a particle diameter distribution measuring device for measuring the particle diameter distribution of a measuring sample, based on the detection values of plural detectors provided for detecting at predetermined angles diffraction light and/or scattered light generated when light is applied to the measuring sample, comprising measuring a measuring sample diluted to different concentrations and storing the detection values of the detectors separately for each concentration with a detection value grabbing program module; and

analyzing the detection values of the detectors in association with the concentrations of the measuring samples and finding the concentration correction constants for each detector which removes the influence of error resulting from concentration with a correction constant generation program module.

Claim 11. The measuring program of Claim 10 wherein the correction constant generation program module comprises: an approximate curve calculation step for finding an approximate curve indicative of a relation between the detection values and the concentration of a measuring sample; an ideal value calculation step for finding the ideal proportionality indicative of the relation between the detection values and the concentration of the measuring sample from the inclination of the approximate curve at the time when the concentration is zero; and a correction constant generation step for finding the concentration correction constant to remove an influence of error resulting from the concentration based on the difference of the detection values with respect to the ideal proportionality.

Claim 12. A measuring program executed by a particle diameter distribution measuring device for measuring the particle diameter distribution of a measuring sample, based on the detection values of plural detectors provided for detecting at predetermined angles diffraction light and/or scattered light generated when light is applied to the measuring sample, comprising:

determining detection values of the respective detectors for different concentrations of the measuring sample to the carrier medium;

determining concentration correction constants from the detection values;

correcting the detection values with the concentration correction constants; and

determining the particle diameter distribution from the correction detection values.